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Future goal setting, task motivation and learning of minority and non-minority students in Dutch schools

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Background. Cross-cultural research on minority school achievement yields mixed findings on the motivational impact of future goal setting for students from disadvantaged minority groups. Relevant and recent motivational research, integrating Future Time Perspective Theory with Self-Determination Theory, has not yet been validated among minority students.

Aims. To replicate across cultures the known motivational benefits of perceived instrumentality and internal regulation by distant future goals; to clarify when and how the future motivates minority students' educational performance.

Sample. Participants in this study were 279 minority students (100 of Turkish and 179 of Moroccan origin) and 229 native Dutch students in Dutch secondary schools.

Methods. Participants rated the importance of future goals, their perceptions of instrumentality, their task motivation and learning strategies. Dependent measures and their functional relations with future goal setting were simultaneously validated across minority and non-minority students, using structural equation modelling in multiple groups.

Results. As expected, Positive Perceived Instrumentality for the future increases task motivation and (indirectly) adaptive learning of both minority and non-minority students. But especially internally regulating future goals are strongly related to more task motivation and indirectly to more adaptive learning strategies.

Conclusion. Our findings throw new light on the role of future goal setting in minority school careers: distant future goals enhance minority and non-minority students' motivation and learning, *if* students perceive positive instrumentality and *if* their schoolwork is internally regulated by future goals.

As a consequence of non-European immigration from the 1960s until today, schools and classrooms in Western Europe have become increasingly multicultural. Learning

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and teaching in such multi-ethnic environments pose a number of challenges to both students and teachers. For example, teachers may have to deal with various cultural norms, identities and styles of achieving in one classroom. Styles of teaching, or established classroom practices that work for western students, need not necessarily work for (non-western) minority children (e.g. Tharp, 1989). This implies the need for cross-cultural validation of theories within educational psychology, if we are to serve all students in today's classrooms (Vansteenkiste, Zhou, Lens, & Soenens, 2005).

At the same time, a focus on minority students may increase our knowledge of their school performance and possible means to improve it. In the Netherlands, Turks and Moroccans are numerically the largest (non-western) minority groups. Turkish and Moroccan adolescents show, despite their educational progress over the years, enduring educational disadvantage as compared with non-immigrant youth (Herweijer, 2003). In spite of the detailed ethnic monitoring of the academic achievement and progress of minority students in the Netherlands, little is known about protective factors against school failure and drop-out in the 'generally more hazardous' school careers of disadvantaged minority students. Research on minority school achievement suggests that a strong and positive future orientation (focusing on future progress in spite of present failures) may be crucial to protect students from disengagement with learning in the face of repeated failure (Meece & Kurtz-Costes, 2001).

The central role of the future in educational investment may be especially relevant in the context of migration. Migration is commonly understood as an intergenerational project to achieve upward social mobility through educational investment in the children (Matute-Bianchi, 1986; Suarez-Orozco & Suarez-Orozco, 1995). In line with this, ethnic minorities in the United States and Europe have been revealed as strong believers in self-improvement through academic achievement. Compared with native parents with a similar social-class background, ethnic minority parents typically express higher aspirations and a more academic orientation towards non-vocational secondary and higher education for their children (Müller & Kerbow, 1993; Nijsten, 1998; Pels, 1998; Vallet & Caille, 1996). In a similar vein, ethnographic studies of minority families and communities have documented high aspirations in ethnic minority families as part of an intergenerational social-mobility project (Matute-Bianchi, 1986; Suarez-Orozco & Suarez-Orozco, 1995; Zéroulou, 1998). Some studies find that high aspirations and future expectations in minority families predict enhanced educational attainment (Clifton, Williams, & Clancy, 1991; Okagaki & Frensch, 1998; Phalet & Andriessen, 2003; Steinberg, Dornbusch, & Brown, 1992; Vallet & Caille, 1996). Such findings of close linkages between immigration, future orientation and school achievement gave rise to the well-known *immigrant optimism hypothesis*, which attributes educational progress in minority youth to parental expectations of upward intergenerational mobility through education (Kao & Tienda, 1995).

However, academic aspirations and expectations not always predict educational attainment in minority youth. Research from a perceived opportunities approach has challenged the psychological viability of future-oriented achievement motivation under conditions of severe disadvantage and discrimination. Perception of blocked mobility in society, experiences of racism and discrimination in the classroom, or low future expectations result in ambivalent attitudes towards achievement (Mickelson, 1990; Okagaki, Frensch, & Dodson, 1996; Phalet & Claeys, 1993). Thus, studies among African–American youth in the US have repeatedly found evidence of low levels of school achievement, in spite of high levels of motivation to achieve upward social mobility through schooling (Ogbu & Simons, 1998).

In light of the challenges posed by multi-ethnic classrooms and the centrality of the future in minority families' educational investments, this study aims to examine when and how the future motivates minority students' school engagement, promoting adaptive learning and protecting them from disengagement. We will investigate minority students' future orientations within the framework of Future Time Perspective Theory (FTPT), which explicitly addresses the role of the future in academic engagement and achievement. However, FTPT has so far only been applied to non-minority students in Western countries. Therefore, cross-cultural validation of this framework is needed.

Future goal setting, motivation and learning

Most research on achievement motivation in academic settings is limited by its one-sided focus on immediate goals in the present task situation, and consequently, by its neglect of the personal and the instrumental relevance of delayed goals in the near or distant future. For many high school and college students, future educational and professional goals are important – if not the most important – motivational resources (Lens, Simons, & Dewitte, 2002). For an adequate understanding of the schooling experience of minority and non-minority students, educational psychology should look beyond immediate classroom goals.

FTPT does just that. The concept of future time perspective refers to people's cognitive capacity to anticipate not only the immediate but also the long-term outcomes of a task in a distant future (De Volder & Lens, 1982). FTPT claims that students with a more extended, valued and connected future time perspective will be more motivated by tasks in the presence. In line with FTPT, and with related approaches from the perceived utility value of school tasks (cf. Eccles & Wigfield, 2002), Lens and Decruyenaere (1991) found in their study in Flanders (Belgium) that the more highly motivated students also attach the highest instrumental value to their schoolwork. Similarly, Van Calster, Lens, and Nuttin (1991) found that perceived instrumentality affects student's task motivation positively. Also in vocational schools, Creten, Lens, and Simons (2001) replicated a positive correlation between the perceived instrumentality of school courses and student motivation for these courses. Not only does the instrumental value of school tasks enhance student motivation, it also contributes to more effective learning strategies and better school results (Lens, Simons, & Dewitte, 2001, 2002; Simons, Dewitte, & Lens, 2000, 2004; Simons, Vansteenkiste, Lens, & Lacante, 2004).

Future goals and self-determination

Future goals, just like immediate goals, differ in content. A student may study medicine to become a competent professional later in life, or to be able to buy a Rolls Royce. In Self-Determination Theory (SDT), intrinsic motivation and goals are distinguished from extrinsic motivation and goals (Deci & Ryan, 2000; Kasser & Ryan, 1993). There is evidence for the basic tenet of SDT that intrinsic motivation and goals are associated with autonomous engagement in a task, thus reinforcing persistence and leading to better performance (Deci, Koestner, & Ryan, 1999). In a similar vein, Vansteenkiste, Simons, Soenens, & Lens (2004) distinguish between 'future intrinsic goals' and 'future extrinsic goals'. Future intrinsic goals are self-chosen and oriented towards self-development (e.g. personal growth or self-competence), whereas future extrinsic goals are defined as imposed or controlled from outside with an emphasis on external rewards (e.g. financial

success). Recent studies show that future intrinsic (vs. extrinsic) goal framing indeed predicts long-term persistence and better performance (Vansteenkiste *et al.*, 2004; Vansteenkiste, Simons, *et al*., 2005).

According to Deci and Ryan's SDT, however, specific goal contents cannot be sharply divided into intrinsic vs. extrinsic types of motivation. Within SDT, gradual distinctions are sometimes made between four styles of regulation that differ in relative degrees of autonomy, ranging from totally externally regulated to fully internally regulated ways of engaging with schoolwork. To the extent that it enables autonomous agency, a goal that is extrinsic to the academic task (e.g. studying medicine to make one's parents proud) can be internally regulating the student's behaviour. Furthermore, we acknowledge that the intrinsic or the extrinsic nature of specific goal contents may vary across cultural contexts of schooling (Markus & Kitayama, 1991; Okagaki, 2001). Rather, what should generalize across cultures is the functional relation between internal or external regulatory focus and adaptive learning (Vansteenkiste, Zhou, *et al*., 2005).

To conclude, what is crucial is not so much the content of the goal but its function. In order to avoid conceptual confusion and cultural bias in classifying goal contents, we will not use the terms 'intrinsic' versus 'extrinsic', but instead focus on whether goals are *internally* or *externally* regulating.

Thus, Lens *et al.* (2001) showed that non-minority Belgian students who experience future goals as self-set goals (internal regulation) are more (intrinsically) motivated for school tasks and use more effective learning strategies, leading to improved school performance. Lens *et al.* (2002) also found that when the learning task was experienced as internally regulated, students score higher on indicators of deep-level learning (actively relating, organising, elaborating and critical thinking) and lower on surface-level learning (verbatim representation of text, memorization without understanding; Entwistle & Entwistle, 1991; Nolen, 1988). In other words, whether future goals are internally or externally regulating makes a difference in their motivational impact.

Aims and hypotheses

This study has two aims. The first is to clarify when and how the future motivates the academic engagement of minority students. In general, future goal setting supports adaptive learning in school. However, some studies do not find that future goals predict motivated learning among minority students. We test two possible motivational explanations for this exception to the rule. First, minority students may have more ambivalent or negative and less positive perceptions of the instrumentality of schooling for future success than non-minority students, possibly because of experiences with discrimination (*Hypothesis 1*). Second, minority students may experience academic or career goals more often as externally controlled, adopting an external rather than internal regulatory focus (*Hypothesis 2*).

The second aim is to validate motivational processes from an integrated FTPT–SDT approach across cultures. We expect that the effects of future goals on motivation and learning are the same across cultures in the sense that, perceived instrumentality to achieve future goals enhances student motivation and learning (*Hypothesis 3*); and that future goals are motivating students to achieve when they are perceived as internally regulating rather than externally controlling (*Hypothesis 4*). In addition, we expect from FTPT that present motivation for school tasks mediates the impact from future goals on learning, because future goals link the pursuit of delayed and immediate goals. More specifically, we expect that perceived instrumentality leads directly and indirectly

through enhanced task motivation to more effective learning strategies (*Hypothesis 5*). We expect similar direct and indirect effects via enhanced task motivation of internally regulating future goals on learning (*Hypothesis 6*). Figure 1 models the hypothesized relationships between future goals, motivation and learning for minority and non-minority students.

Research context

The study involves students in Dutch secondary schools, which are now commonly multicultural (CBS, 2002). Turkish and Moroccan students in this study are the children of labour migrants, who came from rural areas in Turkey and Morocco to The Netherlands between the 1960s and 1980s and who have formed major ethnic communities through subsequent family reunion and family formation. Turks and Moroccans constitute a rather young population (30% below 15 years of age and another 30% below 30 years) and a significant part of these groups is still in school (SCP, 1999). Ethnic minority and native Dutch students differ in terms of their (non-western and traditional) cultural backgrounds and (lower and rural) social class origins. Not only are they facing widespread public prejudice against Muslims (Sniderman, Hagendoorn, & Prior, 2004), but there is also hard proof of ethnic discrimination against Turkish and Moroccan minorities in the Dutch labour market (Bovenkerk, Gras, & Ramsoedh, 1995).

In Dutch secondary schools, ethnic minority status implies educational disadvantage (Veenman, 2001). Turkish and Moroccan youngsters have higher drop-out rates, are overrepresented in lower educational tracks and underrepresented in higher education (Herweijer, 2003). Educational disadvantage persists, at least to some extent, in the second generation, and remains significant after controlling for socio-economic factors (Driessen, 1993, 1995; Kalmijn & Kraaykamp, 2000; Leseman & De Jong, 1998; Leseman, Sijsling, Jap-A-Joe, & Sahin, 1995; Roelandt, Martens, & Veenman, 1991).

Method

Participants and procedure

Participants are Turkish ($N = 100$) and Moroccan ($N = 179$) minority students and a non-minority comparison group of Dutch classmates ($N = 229$). Eleven schools with a significant presence of Turkish and/or Moroccan minority students were selected in four middle-sized communes in The Netherlands. Within schools, classes were selected for participation with a view to cover the complete range of the Dutch tracking system, including higher (non-vocational) as well as lower (vocational) tracks. Within classes, participation was obligatory for all students in order to avoid self-selection. After completion of the questionnaire, students were given the opportunity to withdraw their responses by not handing them in. None of the students made use of this opportunity. Students were categorized into ethnic groups on the basis of ethnic self-identification.

One half of the students in the sample are boys, and the other half are girls. The mean age of participants is 15 years with minority students being moderately older than their native classmates (res. between the ages of 15;4 and 15;8 years). The majority of students attend the second or third year of secondary school (66%). Minority students in the sample are overrepresented in vocational training: 76% of Turkish and 66% of Moroccan students in our study are in vocational school tracks as opposed to 21% of native Dutch students. The schools that participated have an average population of 30% minority and 70% native Dutch students.

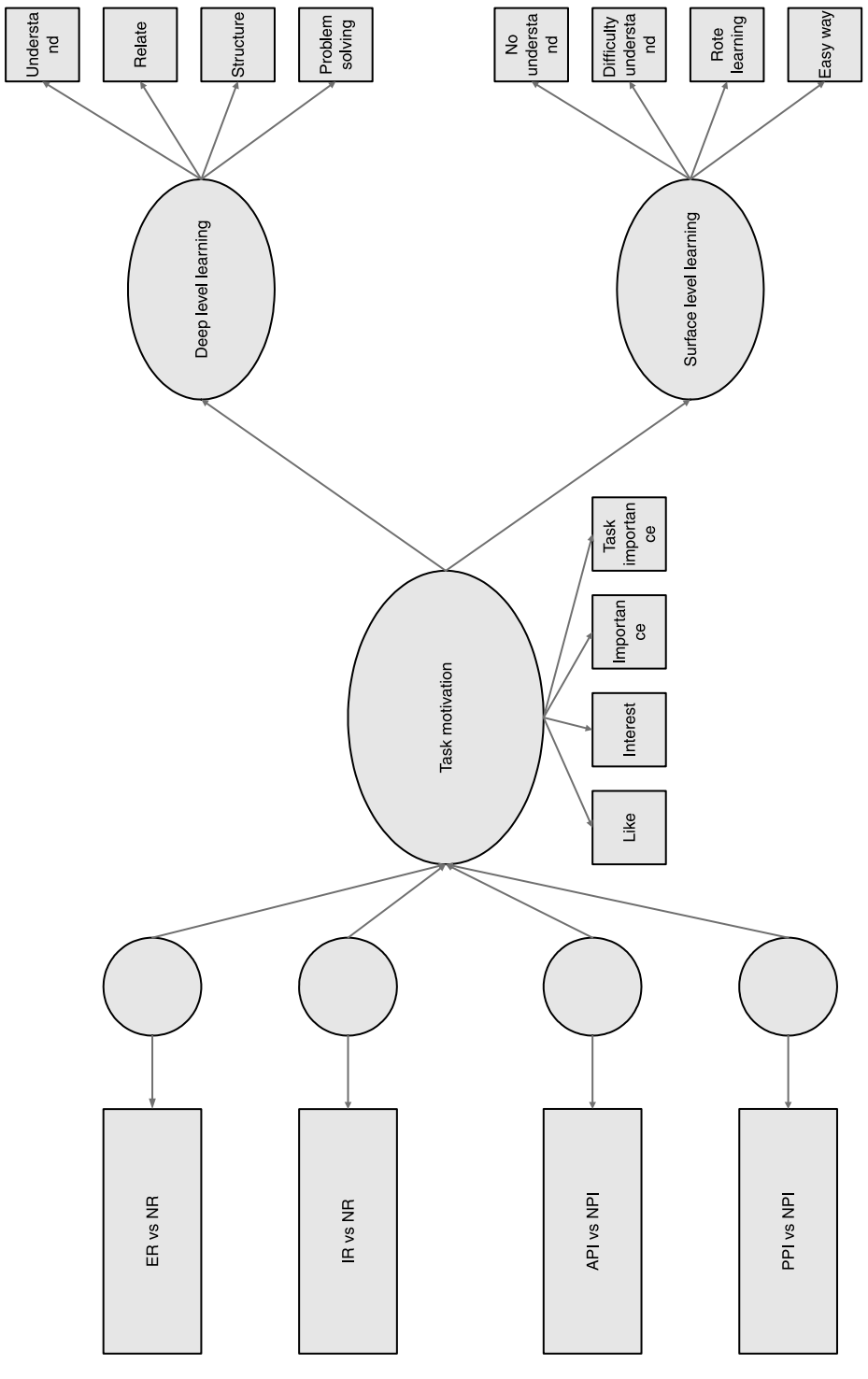

Figure 1. Hypothetical path model in SEM.

Most minority youth have unschooled or low-schooled parents. Of the Turkish mothers in our sample, 38% have not completed primary school; the same is true of 68% of the Moroccan mothers, as opposed to 7% of native Dutch mothers. The educational status of the mother is used as an index of parental education for reasons of reliability.[1] Moreover, maternal education is directly relevant to the child's schooling: minority students in our study reported more educational support from mothers than from fathers.

Most minority students are born in The Netherlands, or migrated at age 6 or younger (86%). Students filled out paper-and-pencil questionnaires on future orientation, motivation and learning in class or in small groups in the presence of the researcher. For the purpose of external validation, teachers have been asked to rate student effort and performance for all participants. Identification numbers were assigned to students in order to match teacher ratings with student questionnaires. After the matching, data records were anonymized by deleting all information that could be traced to students' identities. Care was taken to ensure that the identity of participating students remained confidential to the research team and was not in any way released back to the participating schools and their staff.

Measures

Social background variables

To ensure cross-cultural comparability, we include in our analyses social class variables associated with educational disadvantage. In addition to Ethnic Origin (Turkish, Moroccan or Dutch), we control for the effects of Gender (1 = boy, 0 = girl), School Track (from 1 = lower vocational, up to 10 = higher non-vocational training), Parental Education (from 1 = mother unschooled, up to 5 = mother with tertiary education) and Ethnic Composition of the school. Ethnic composition for minority students refers to the percentage of students from the same ethnic background; for majority students, this is measured as the percentage of non-minority (majority) students.

Perceived instrumentality

In order to assess their perceptions of the instrumental value of schoolwork for being successful later in life, students are asked two parallel questions: (a) how many persons do you know who are successful in their career *because they have done well in school?* none, few or many? and (b) how many persons do you know who have a successful career *in spite of having failed or left school?* none, few or many? Students who know more successful persons who did well in school than who did not, are assigned to the Positive Perceived Instrumentality (PPI) category; in contrast, students who know more people who are successful later in life without doing well in school, are assigned to the opposite Negative Perceived Instrumentality (NPI) category; students who know as many (or as few) people who are successful later with and without doing well in school, are assigned to the intermediate category of Ambivalent Perceived Instrumentality (API). In structural equation modelling (SEM) analyses, dummy variables were constructed with NPI as reference category.

Teacher ratings of students' effort and performance levels are used as an external criterion to validate the instrumentality scores. Ratings were collected from math and language teachers and indicate their global appreciation of students' effort

[1] *Student reports have been checked against self-reported levels of education in face-to-face interviews with mothers*

(*how hard does a student work for school? from 1 to 5, very much*) and performance (*how well does a student perform in class? from 1 to 5, very good*). Across ethnic groups and controlling for relevant social background variables, students with negative (NPI) or ambivalent (API) perceptions of instrumentality were rated by their teachers as less motivated than students who perceive positive instrumentality (PPI), see Figure 2a. Differences between the three categories in teacher ratings of student's performance follow the same trend, although they did not reach significance (see Figure 2b). Overall, the analysis supports the external validity of distinct types of perceived instrumentality.

Internal regulation

Building on a cross-cultural validation of Nuttin and Lens (1985) Motivational Induction Method (Phalet & Claeys, 1993), future goals were assessed by three statements: I study to prepare myself for my personal life project ('person'); I do my schoolwork because it

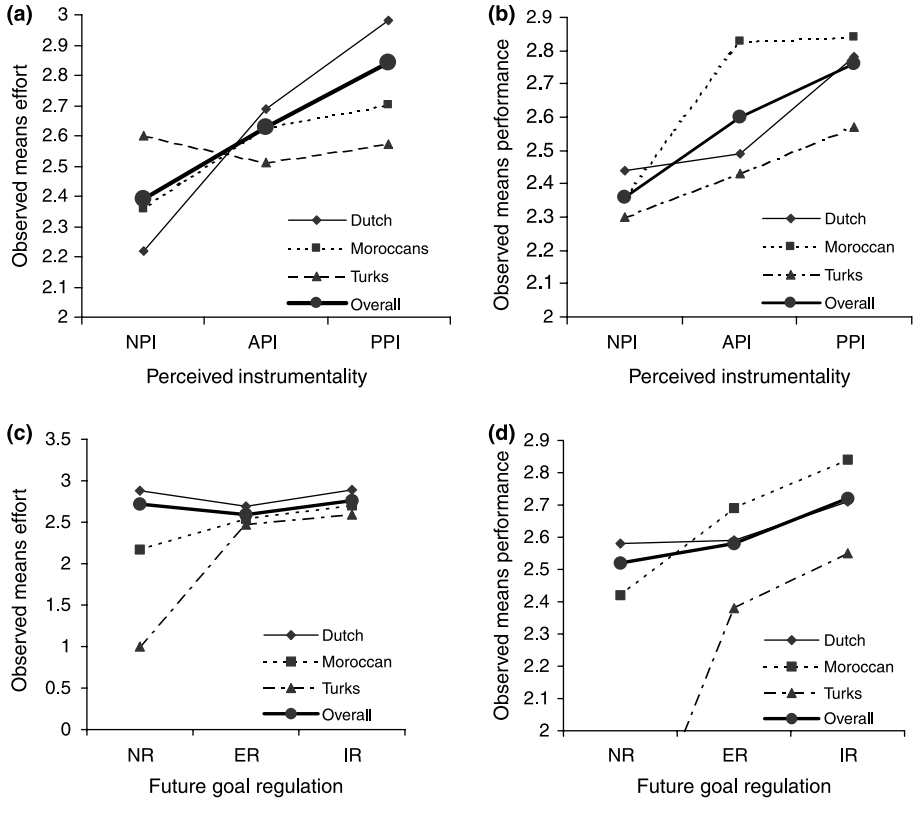

Figure 2. (a) Teacher evaluation of student effort for school tasks as a function of student's perceived instrumentality and ethnic origin. **(b)** Teacher evaluation of student performance as a function of perceived instrumentality and ethnic origin. **(c)** Teacher evaluation of student effort for school tasks as a function of regulation by future goals and ethnic origin. **(d)** Teacher evaluation of student performance as a function of regulation by future goals and ethnic origin.

Note. NPI, Negative Perceived Instrumentality; API, Ambivalent Perceived Instrumentality; PPI, Positive Perceived Instrumentality; NR, No Regulation; ER, External Regulation; IR, Internal Regulation.

is useful to get a job ('job'); I need my diploma to improve my family's standard of living ('living').[2] Students were asked to rate these goals from (1) not important to (3) very important. While the first future goal (person) is motivated by self-development and should therefore be internally regulating students' schoolwork, both the other goals (job and living) refer to future rewards, such as employment and family income, which are thought to control school engagement externally.

To categorize students into distinct motivational types, their ratings of the three goals are combined: students who attach low value to all three future goals are assigned to a residual No Regulation category (NR), meaning that their school engagement is not regulated by distant future goals; students who value employment or income as future rewards for school success, but not personal self-development, are assigned to the External Regulation (ER) category; finally, students who (also) value personal self-development make up the Internal Regulation (IR) category. Note that students in the latter IR category may also value external rewards in the distant future, in addition to personal self-development. In SEM analyses dummy variables were constructed with NR as reference category. Thus we test the unique motivational effect of internally regulating future goals, over and above the effect of externally regulating goals.

Again, motivational categories are externally validated by teacher ratings of students' effort and performance. Across ethnic groups and controlling for social class, internal regulation predicts the highest performance ratings, and no regulation predicts the lowest. We found a similar trend in mean effort ratings, which does not reach significance (see Figure 2c and d). Overall, the analysis supports the external validity of distinct categories of regulation.

Assessment of task motivation and learning

Task motivation (four items) and Deep learning (four items) subscales were translated and adapted from Pintrich *et al.*'s Motivated Strategies for Learning Questionnaire (MSLQ: Pintrich, Smith, Garcia, & McKeachie, 1991). Highest loading items in Dutch-language pilot studies of the MSLQ were selected. As an additional index of maladaptive learning, the subscale measuring Surface-level learning (four items) from Entwistle and Tait's Revised Approaches to Studying Inventory (RASI, Entwistle & Tait, 1997) was also included in the study. Simultaneous Component Analysis (SCA) replicates the factor structure of the MSLQ subscales along with an additional factor Surface-level learning (Kiers, 1990). The explained variances by the common three-factor solution total 43% for Turkish, 48% for Moroccan and 46% for Dutch comparison groups. Overall, distinct factors for task motivation, deep and surface-level learning in SCA supports the construct validity of the dependent measures across cultures.

Task motivation refers to students' motivation to engage with school tasks in general and in the present. It refers to the value component in an expectancy-value model of motivation (Pintrich, 1999). Items refer to liking most courses, finding the contents of the lessons interesting, wanting to keep up with the lessons, and thinking that most courses are important. For all motivational items in this study, the same response categories were used: (1) not true for me, (2) sometimes true for me, (3) completely true for me. Multi-group measurement models with Confirmatory Factor

[2] *Getting a college degree was not included as a relevant future goal in this study, because the Dutch school systems precludes access to university for students in vocational schools, and because very few Turkish or Moroccan minority students go to university in the Netherlands – from 3% in 1995–1996 up to 6% in 2001–2002 (Herweijer, 2003).*

Analysis (CFA) support the reliability of our task value measure in all ethnic groups (cf. Bollen, 1989; see Table 1 for the question wordings and the factor loadings).

Deep Learning is measured by a combination of subscales from the MSLQ (Pintrich *et al.*, 1991). Items refer to actively structuring (cognitive organization), understanding (cognitive self-regulation) and relating course materials (cognitive elaboration) and solving problems (critical thinking). Multi-group measurement models with Confirmatory Factor Analysis (CFA) support the reliability of the combined measure in all ethnic groups (see Table 1 for the question wordings and the factor loadings).

Surface-level learning is measured by a subscale of the RASI (Entwistle & Tait, 1997). Items refer to superficial memory strategies (e.g. copying lessons) and passive learning (use words without meaning, read without understanding). Multi-group measurement models with Confirmatory Factor Analysis (CFA) support the reliability of our measure in all ethnic groups (see Table 1 for the question wordings and the factor loadings. Appendices A and B provide more detailed information about the psychometric properties of the measures).

Analyses

The analysis consists of two parts. The first part is exploratory, testing ethnic group differences in future goal settings and testing for the effects of future goals on academic engagement across ethnic groups. The main part of the analyses is confirmatory in nature and consists of a more stringent test of the hypothesized cross-cultural model, using a SEM approach.[3]

Exploratory analyses

Ethnic group differences in instrumentality and regulation by future goals (*Hypotheses 1 and 2*) are tested by multinomial logistic regression. In order to control for differences between native and minority students in terms of school context and social class, School Track, Ethnic Composition of the School and Parental Education were included as covariates.

We tested for ethnic group differences in motivated learning, as well as for the cross-cultural impact of future orientation on task motivation and learning by means of analysis of covariance (ANCOVA) (*Hypotheses 3 and 4*). Ethnic Origin, Gender and Perceived Instrumentality (PPI, API or NPI) were entered as independent variables in a ($3 \times 2 \times 3$) multivariate design, with School Track, Ethnic Composition of the School and Parental Education as covariates. Dependent variables were task motivation, deep-level learning, and surface-level learning. In a subsequent analysis with the same multivariate design we replaced Perceived Instrumentality with NR, ER or IR. Scheffé's correction is applied to *post hoc* pairwise comparisons of means between ethnic and motivational categories. The fully controlled ANCOVA's allow us to test net motivational effects across ethnic groups, over and above structural constraints on motivation and learning of minority students.

Structural equation modelling (SEM)

SEM is chosen as a most stringent approach to cross-cultural validation and hypothesis testing. SEM specifies separate models for each ethnic group and tests

[3] *All variables were inspected for violation of the assumption of normality. None of the distributions of the variables used in the analyses departed substantially from normality, as indicated by skewness and kurtosis statistics (all smaller than |1.5| (West, Finch, & Curran, 1995).*

Table 1. Final cross-cultural measurement models of task motivation and learning strategies: common metric completely standardized loadings in invariant condition

	Task motivation	Deep-level learning	Surface-level learning
Y5 I like most courses we study in school [like]	.58		
Y6 I am almost always interested in the contents of my lessons [interest]	.59		
Y7 It is important to me to keep up with the lessons [importance]	.57		
Y8 I think most tasks we work on in school are important to me [task importance]	.50		
Y9 When I learn something new I try to really understand what it is about [understand]		.35	
Y10 I try to understand my classes by looking how things relate to each other [relate]		.50	
Y11 When studying I often make use of drawings or summaries [structure]		.39	
Y12 When making exercises I want to find the solution by myself [problem solving]		.37	
Y13 I often read my lessons without really understanding what it is about [no understand]			.53
Y14 I often have difficulties in understanding the meaning of words [difficulty understand]			.50
Y15 Most often I need a lot of time to rehearse or to copy my lessons [rote learning]			.49
Y16 If a task is too difficult, I only make the easy exercises [easy way]			.46

for invariance across these groups (Bollen, 1989). Secondly, hypotheses on the impact of future goals on motivation and learning are specified within-groups, and then tested for invariance across groups (*Hypotheses 3 and 4*). In addition, estimates in SEM provide information on the strength of the association between future goal setting and motivated learning within-groups and across groups. Furthermore, structural equation models simultaneously specify direct and indirect motivational effects, thus testing for mediation in one step. Importantly, the effect parameters in SEM are specified at the latent level, which means that they estimate the strength of association between future goals setting and motivated learning after correction for measurement error in our dependent measures.

The perceived instrumentality (positive or ambivalent versus negative) of future goals and their regulatory focus (internal or external versus none) are specified as predictors, Task Motivation as a mediator (*Hypotheses 5 and 6*), and deep-level and surface-level learning as criterion variables.[4]

[4] *Both direct and indirect effects of perceived instrumentality and future goals on learning strategies are tested. Causal effects that are not significant at the .05 level in at least one group are set to zero. The cross-cultural equivalence of the general motivational model is seen to be fully supported, if the fit of a multi-group model with invariant causal effects (causal invariance) is not significantly worse (on the basis of a* χ^2 *difference test) than the fit of a less restrictive model where causal effects are free to vary between groups. If one or more causal paths are significantly different between groups, there is only partial causal invariance, hence partial equivalence across cultures (Byrne, 1998).*

Results

Exploratory analyses of ethnic group differences

Logistic regression shows no ethnic group differences in the perceived instrumentality of academic engagement for the future, after controlling for ethnic composition of the school, school track and educational status of the mother. A majority of all students report positive perceptions of instrumentality, linking school success to success later in life. A significant minority across ethnic groups report ambivalent or negative perceptions. The greater gross proportions of ambivalent and negative perceptions among minority students, however, are fully accounted for by social background and school context (see Figure 3a).

Ethnic groups differ on regulation by future goals. Native Dutch students are found more often in the NR category and less often in the IR category compared with Turkish

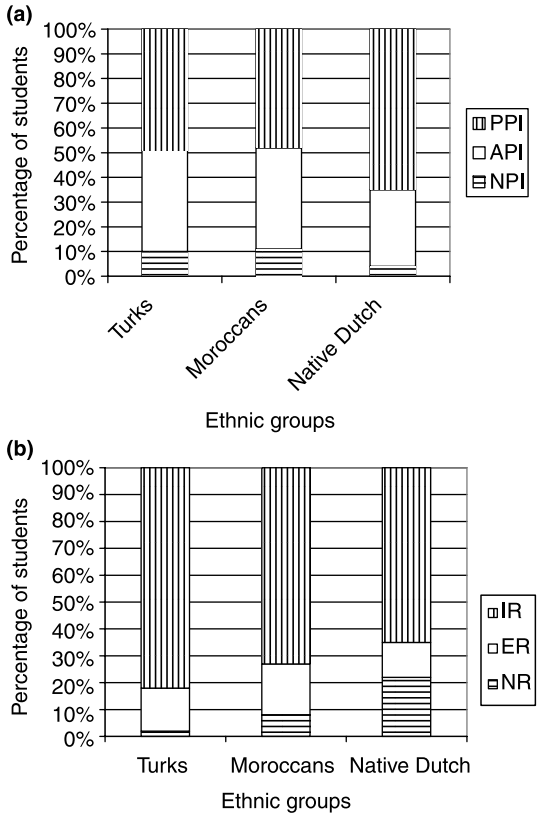

Figure 3. (a) Percentage of students for each ethnic group over categories of PPI ($N = 49$ (Turks), $N = 83$ (Moroccans), $N = 149$ (Dutch)), API ($N = 41$ (Turks), $N = 72$ (Moroccans), $N = 70$ (Dutch)), NPI ($N = 10$ (Turks), $N = 19$ (Moroccans), $N = 9$ (Dutch)). **(b)** Percentage of students for each ethnic group over categories of IR ($N = 83$ (Turks), $N = 130$ (Moroccans), $N = 149$ (Dutch)), ER ($N = 16$ (Turks), $N = 33$ (Moroccans), $N = 29$ (Dutch)), NR ($N = 2$ (Turks), $N = 15$ (Moroccans), $N = 51$ (Dutch)).

Note. NPI, Negative Perceived Instrumentality; API, Ambivalent Perceived Instrumentality; PPI, Positive Perceived Instrumentality; NR, No Regulation; ER, External Regulation; IR, Internal Regulation.

students (Exp. (B) = 9.41, $p = .004$; Nagelkerke's $R^2 = .15$). Figure 3b illustrates this difference.

Across cultures, ANCOVA yields a significant main effect of Perceived Instrumentality on task motivation ($F(2, 347) = 3.58$, $p = .029$): students who are in the PPI category are the most motivated; students in the NPI category are least motivated for school tasks. Also a significant main effect was found of regulation by future goals on task motivation ($F(2, 350) = 6.09$, $p = .003$). Students who are internally (IR) or externally regulated (ER) by future goals attach more value to academic tasks, than those students who lack regulation by future goals (NR) do. Regulation by future goals also impacts on surface-level learning, such that students who are externally regulated by future goals use more surface-level learning than students who are internally motivated ($F(2, 348) = 5.30$, $p = .005$. Lastly, deep level learning is affected by regulation from future goals, such that students who are internally regulated by future goals use more deep level learning, than students in the NR and ER categories ($F(2, 350) = 6.63$, $p = .001$).[5]

SEM analyses

We used a stepwise approach in building the structural models. Firstly, multi-group measurement models were specified to test the cross-cultural equivalence of the motivational concepts and scales[6] (Van de Vijver & Leung, 1997). Based on a chi-squared difference test the cross-cultural equivalence of motivational constructs was fully supported ($\delta\chi^2_{(18)} = 15.06$, $p < .35$).

Next, the measurement models are included as latent dependent variables in a multi-group structural model to test the hypothetical motivational model (see Figure 1). In all groups, this model had a good fit. However, modification indices for structural relations suggested that two paths are present: the dummy variable ER vs. NR has a direct effect on deep level and surface-level learning. This adjusted model could successfully be constrained to invariance across cultures ($\delta\chi^2_{(16)} = 15.87$, $p > .50$), and is shown in Figure 4.

In a last step, all motivational concepts are conditioned on Gender, Ethnic Composition of the school, School Track and Parental Education as exogenous variables. This last model tests the net explanatory value of the perceived instrumentality and the future goals across cultures, after controlling for within-culture motivational differences in function of gender, ethnic composition, family background and school track. The hypothesized motivational effects of future goal setting remained significant and the final model showed a good fit $\delta\chi^2_{(421)} = 582.262$, RMSEA = 0.048, NNFI = 0.89, CFI = 0.92)[7]. Table 2 lists all the beta parameters (structural effects) and gamma parameters (effects of control variables) for this model.

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[5] *Apart from the main effects of future goals, we also found an interaction effect of ethnic group by gender (*$F(2, 348) = 3.55$, $p = .03$*): native Dutch girls use more surface level learning in comparison with native Dutch boys, whereas Turkish boys use more surface level learning than Turkish girls. Also, an effect of school track was found on task motivation (*$F(1, 347) = 6.17$, $p = .014$*): students in higher tracks report less task motivation than students in lower tracks.*

[6] *Cross-cultural equivalence is considered supported if the fit of a multi-group model with invariant factor loadings (factorial invariance) is not significantly worse (on the basis of a χ^2 difference test) than the fit of a less restrictive baseline model, where factor loadings are free to vary between groups (Byrne, 1998).*

[7] *Model evaluation is based on the formal χ^2 test. The evaluation of formal fit is complemented by information from three informal fit measures (cf. Schumacher & Lomax, 1996): Joreskog and Sorbom's (1993) Goodness of Fit Index (*GFI $> .90$ *indicates a good fit); Bentler's (1990) robust Comparative Fit Index (*CFI $> .85$ *is seen as a good fit); and (3) Browne and Cudeck's (1993) Root Mean Squared Error of Approximation (*RMSEA $< .05$ *indicates a good fit).*

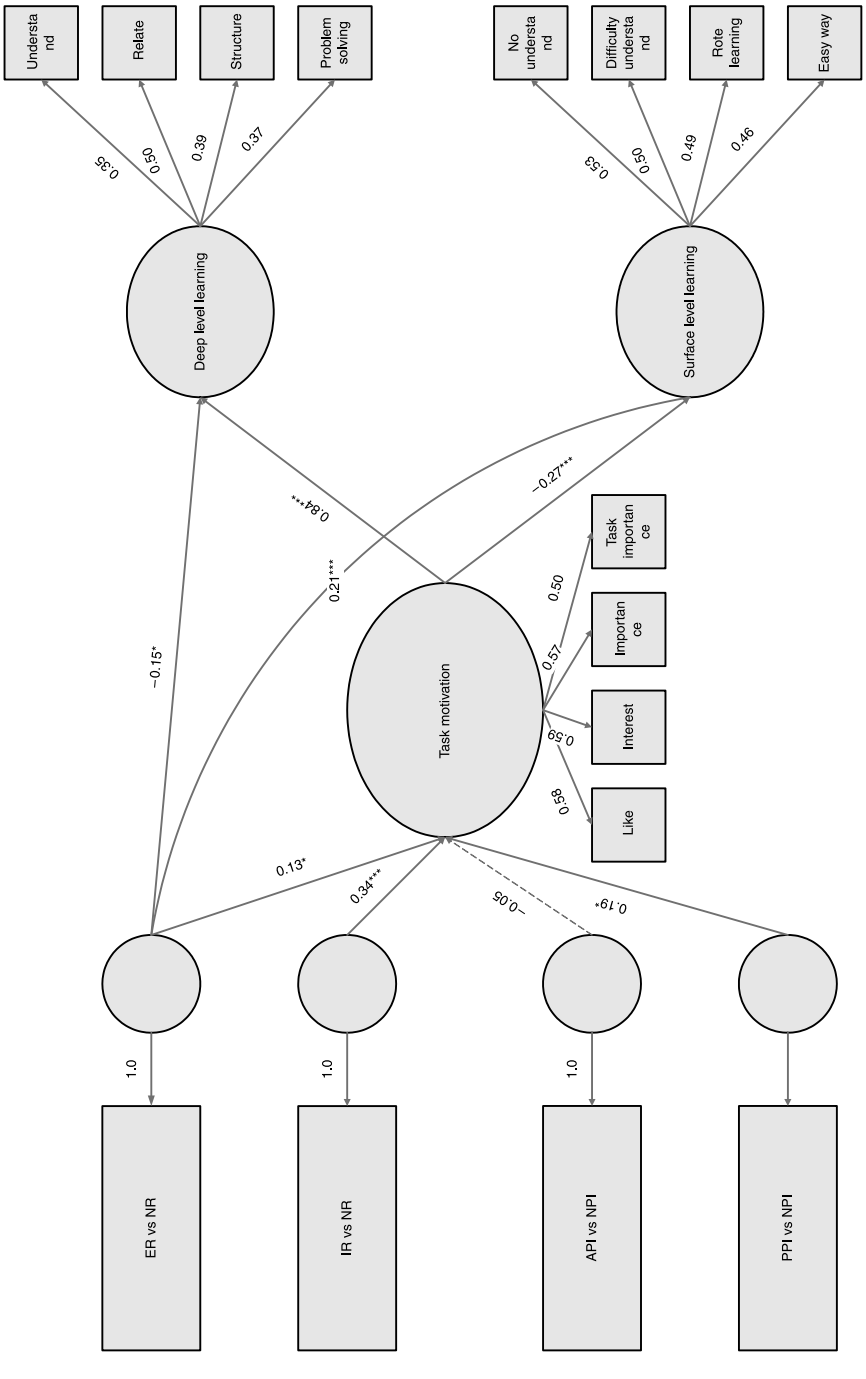

Figure 4. Empirical structural model of relations between future goals, student motivation and learning, controlled for ethnic composition of the classroom, gender, educational track and educational status of student's mother.
$*p < .05$, $**p < .01$, $***p < .001$.

Table 2. Parameters of structural paths in final SEM model. Common metric completely standardized parameters

	API vs. NPI	PPI vs. NPI	ER vs. NR	IR vs. NR	Task motivation	Ethnic composition	Educational track	Gender	Education mother
API vs. NPI						D:0.07	D: − 0.04	D:0.01	D: − 0.15*
						M:0.02	M: − 0.09	M: − 0.10	M:0.13*
						T:0.18	T: − 0.13	T: − 0.09	T: − 0.22*
PPI vs. NPI						D: − 0.04	D:0.14*	D: − 0.01	D:0.21**
						M:0.06	M:0.12	M:0.11	M: − 0.11*
						T: − 0.17	T:0.24**	T:0.03	T:0.20*
ER vs. NR						D:0.05	D: − 0.23	D: − 0.07	D:0.04
						M:0.01	M: − 0.063	M:0.11	M: − 0.13*
						T:0.02	T: − 0.01	T:0.07	T:0.04
IR vs. NR						D:0.00	D:0.12	D:0.18**	D: − 0.07
						M:0.01	M:0.02	M: − 0.09	M:0.07
						T:0.06	T:0.03	T: − 0.08	T: − 0.08
Task	− 0.05	0.19*	0.13*	0.34***		D: − 0.16*	D: − 0.32**	D: − 0.11	D:0.09
						M: − 0.02	M: − .34***	M: − 0.13	M: − 0.24**
						T:0.16	T: − .008	T: − 0.06	T: − 0.19*
Deep			− 0.15*		0.84***	D: − 0.15	D: − 0.01	D: − 0.17*	D: − 0.15
						M:0.07	M:0.34**	M:0.11	M:0.16
						T:0.18	T:0.07	T:0.16	T:0.31**
Surface			0.21***		− 0.27***	D: − 0.05	D:0.17	D: − 0.26**	D: − 0.02
						M: − 0.13	M: − 0.29**	M: − 0.08	M: − 0.22**
						T: − 0.01	T: − 0.13	T: − 0.10	T:0.04

Note. D = native Dutch students, M = Moroccan students, T = Turkish students.
*$p < .05$. **$p < .01$. ***$p < .001$.

The final model supports partial rather than complete mediation. Most effects of the future goals go through task motivation: we find a positive indirect effect of PPI (as opposed to NPI) on adaptive learning. ER and in particular IR by future goals contribute positively to task motivation, and therefore indirectly to adaptive learning (more deep-level learning, less surface-level learning). In short, students who perceive positive – rather than ambivalent or negative – connections with valued future goals, are more motivated for school tasks, and hence more often engaging in adaptive deep learning and less prone to maladaptive surface-level learning. This is true of minority as well as non-minority students. Similarly, students with an internal regulatory focus on self-development in the distant future are most motivated by school tasks, and hence most likely to adopt adaptive deep-learning strategies rather than maladaptive surface-level learning strategies. Moreover, the motivational effects of future goal setting remain significant and substantive in the final model, which takes into account gender, family background and school context.

However, external regulation also directly influences learning, reducing deep-level learning and enhancing surface-level learning. Maladaptive direct effects of external regulation on learning therefore counteract the adaptive effects of external regulation through task motivation. Apparently, external regulation is a double-edged sword, which may support adaptive learning by increasing student motivation for school tasks, while at the same time putting students at risk of using maladaptive surface-level learning strategies. In sum, PPI (rather than NPI) and internally regulating future goals contribute significantly to adaptive learning across cultures.

Conclusions

We tested the cross-cultural validity of the role of future goals in student motivation and learning using multi-group models by SEM. We found that the general motivational processes that are associated with future orientation are cross-culturally valid, confirming our Hypotheses 3 and 4. Across cultures, motivation plays a key role in linking up perceived instrumentality and regulatory focus with effective learning strategies, which is consistent with Hypotheses 5 and 6. The cross-cultural model remains significant after controlling for gender, school track, ethnic composition of the school and the parental education. Hence, the findings show the relevance of a future time perspective for enhancing student motivation and adaptive learning in multicultural classrooms.

We expected from motivation theory and research (e.g. Deci & Ryan, 1985; Eccles, 1984; Lens *et al.*, 2001) that PPI and IR would contribute to the motivation to perform school tasks. This was found to be the case. However, also external regulation was found to enhance task motivation. Hence, both external and internal future goals reinforce task motivation, but the effect of internal goals is stronger. Moreover, external regulation also has direct maladaptive effects; it reinforces surface-level learning and reduces deep-level learning. Taken together, distant future goals enhance minority and non-minority students' motivation and learning, *if* students perceive positive instrumentality and *if* their schoolwork is internally regulated by future goals.

When direct and indirect motivational effects are separated out, it appears that future goals regulate classroom behaviour primarily through their impact on task motivation. Students who value distant future goals, especially, self-set future goals, and those who perceive positive connections between present school tasks and future goals,

develop an increased interest in their schoolwork. This increased interest in-turn motivates effective learning in the classroom.

This study supports the relevance of the future as a means of protecting minority students from disengagement with learning (Meece & Kurtz-Costes, 2001). Our exploratory analyses suggest, in contrast with Hypothesis 2, that minority students attach more importance to future goals in general, and to internally regulating self-development goals in particular, than native Dutch students. Furthermore, minority and non-minority students do not differ in the perceived utility of school tasks for future goals, once social class and school context are taken into account. Clearly, future goals are important in the school motivation of minority as well as non-minority students. The adaptive effect of internally regulating future goals suggests a possible means of improving minority students' educational performance. Future goals should receive attention in multi-ethnic classrooms by stimulating students to think about their future and set their own goals. To what extent the motivational impact of future goals may be limited by conditions of severe disadvantage and discrimination, by attenuating a positive perception of the instrumentality of schooling (cf. Hypothesis 1), should be addressed by future research.

References

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*, 238–246.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Bovenkerk, F., Gras, M. J. I., & Ramsoedh, D. (1995). *Discrimination against migrant workers and ethnic minorities in access to employment in the Netherlands* (International Migration Paper no. 4). Geneva: International Labour Office.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Byrne, B. M. (1998). *Structural equation modelling with Lisrel, Prelis, and Simplis: Basic concepts, applications, and programming*. New Jersey/London: Erlbaum.

CBS (Centraal Bureau voor de Statistiek). (2002). *Allochtonen in Nederland* [Minorities in the Netherlands]. Voorburg/Heerlen: Centraal Bureau voor de Statistiek.

Clifton, R. A., Williams, T., & Clancy, J. (1991). The academic attainment of ethnic groups in Australia: A social-psychological model. *Sociology of Education*, *64*, 111–126.

Creten, H., Lens, W., & Simons, J. (2001). The role of perceived instrumentality in student motivation. In A. Efklides, J. Kuhl, & R. M. Sorrentino (Eds.), *Trends and prospects in motivation research* (pp. 33–45). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, *125*, 627–688.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.

De Volder, M. L., & Lens, W. (1982). Academic achievement and future time perspective as a cognitive-motivational concept. *Journal of Personality and Social Psychology*, *42*, 566–571.

Driessen, G. (1993). Socio-economic or ethnic determinants of educational opportunities? Results from the educational priority programme in the Netherlands. *Studies in Educational Evaluation*, *19*(3), 265–280.

Driessen, G. (1995). Het relatieve belang van sociaal-milieu en etnische herkomst voor de verklaring van onderwijsachterstanden. Een overzicht van kwantitatief-empirische studies; bevinden en problemen [The relative importance of socio-economic background and ethnic

origin in the explanation for educational disadvantage]. *Tijdschrift voor Onderwijsresearch*, *20*(4), 265–280.

Eccles, J. (1984). Sex differences in achievement patterns. In B. Sonderegger (Ed.), *Nebraska symposium on motivation* (Vol. 32, pp. 97–132). Lincoln, NE: University of Nebraska Press.

Eccles, J., & Wigfield, A. (2002). Motivational beliefs, values and goals. *Annual Review of Psychology*, *53*(1), 109–124.

Entwistle, N., & Entwistle, A. (1991). Contrasting forms of understanding for degree examinations: The student experience and its implications. *Higher Education*, *22*, 205–277.

Entwistle, N., & Tait, H. (1997, August). *The Revised Approaches to Studying Inventory (RASI): Patterns of response to a study strategy questionnaire*. Paper presented at the 7th EARLI meeting, Athens, Greece.

Herweijer, L. (2003). Voortgezet onderwijs, beroepsonderwijs en hoger onderwijs. In J. Dagevos, M. Gijsberts, & C. van Praag (Eds.), *Rapportage minderheden 2003* [Minorities Report]. Den Haag: Sociaal en Cultureel Planbureau.

Joreskog, K., & Sorbom, D. (1993). *Lisrel 8 User's guide*. Chicago: National Educational Resources.

Kalmijn, M., & Kraaykamp, G. (2000, May). *Family-based social capital and ethnic inequality: An event-history analysis of secondary school dropout in the Netherlands*. Paper presented at the 50th Anniversary Meeting of the ISA Research Committee 28 on Social Stratification. Libourne, France.

Kao, G., & Tienda, M. (1995). Optimism and achievement: The educational performance of immigrant youth. *Social Science Quarterly*, *76*, 1–19.

Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology*, *65*(2), 410–423.

Kiers, H. A. L. (1990). *Simultaneous component analysis (SCA)*. Groningen: Progamma.

Lens, W., & Decruyenaere, M. (1991). Motivation and demotivation in secondary education: Student characteristics. *Learning and Instruction*, *1*, 145–159.

Lens, W., Simons, J., & Dewitte, S. (2001). Student motivation and self-regulation as a function of future time perspective and perceived instrumentality. In S. Volet & S. Järvelä (Eds.), *Motivation in learning contexts: Theoretical advances and methodological implications* (pp. 233–248). New York: Pergamon.

Lens, W., Simons, J., & Dewitte, S. (2002). From duty to desire: The role of students' future time perspective and instrumentality perceptions for study motivation and self regulation. In F. Pajares & T. Urdan (Eds.), *Adolescence and education. Academic motivation of adolescents* (Vol. 2, pp. 221–245). Greenwich, CT: Information Age Publishing.

Leseman, P. P. M., & De Jong, P. F. (1998). Home literacy: Opportunity, instruction, cooperation and social-emotional quality predicting early reading achievement. *Reading Research Quarterly*, *33*(3), 294–318.

Leseman, P. P. M., Sijsling, F. F., Jap-A-Joe, S. R., & Sahin, S. (1995). Gezinsdeterminanten van de cognitieve ontwikkeling van vierjarige Nederlandse. Surinaamse en Turkse kleuters [Family determinants in the cognitive development of four year-old Dutch, Surinamese and Turkish children]. *Pedagogische Studiën*, *72*(3), 186–205..

Markus, H. R., & Kitayama, S. K. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224–253.

Matute-Bianchi, M. E. (1986). Ethnic identities and patterns of school success and failure among Mexican-descent and Japanese-American students in a California highschool. *American Journal of Education*, *95*, 233–255.

Meece, J. L., & Kurtz-Costes, B. (2001). The schooling of minority children and youth. *Educational Psychologist*, *36*(1), 1–8.

Mickelson, R. A. (1990). The attitude-achievement paradox among black adolescents. *Sociology of Education*, *63*, 44–61.

Müller, C., & Kerbow, D. (1993). Parent involvement in the home, school and community. In B. Schneider & J. Coleman (Eds.), *Parents, their children and schools* (pp. 13–42). Boulder: Westview Press.

Nijsten, C. (1998). *Opvoeding in Turkse gezinnen in Nederland* [Child raising in Turkish families living in the Netherlands]. Assen: Van Gorcum.

Nolen, S. B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction*, *5*(4), 269–287.

Nuttin, J., & Lens, W. (1985). *Future time perspective and motivation: Theory and research method*. Leuven: Leuven University Press and Lawrence Erlbaum.

Ogbu, J. U., & Simons, H. D. (1998). Voluntary and involuntary minorities. A cultural ecological theory of school performance with some implications for education. *Anthropology and Education Quarterly*, *29*, 155–188.

Okagaki, L. (2001). Triarchic model of minority childen's school achievement. *Educational Psychologist*, *36*, 9–20.

Okagaki, L., & Frensch, P. A. (1998). Parenting and children's school achievement: A multi ethnic perspective. *American Educational Research Journal*, *35*, 123–144.

Okagaki, L., Frensch, P. A., & Dodson, N. E. (1996). Mexican-American children's perceptions of self and school achievement. *Hispanic Journal of Behavioral Sciences*, *18*, 469–484.

Pels, T. (1998). *Opvoeding in Turkse gezinnen in Nederland* [Child raising in Turkish families living in the Netherlands]. Assen: Van Gorcum.

Phalet, K., & Andriessen, I. (2003). Acculturation and educational attainment: Towards a contextual approach of minority school achievement. In L. Hagendoorn, J. Veenman, & W. Vollebergh (Eds.), *Integrating immigrants in the Netherlands* (pp. 145–172). Aldershot: Ashgate, Research in Migration and Ethnic Relations Series.

Phalet, K., & Claeys, W. (1993). Beyond individualism-collectivism: A comparative study of Turkish and Belgian youth. *Journal of Cross-Cultural Psychology*, *24*, 319–343.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research*, *31*(6), 459–470.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the motivated strategies of learning questionnaire (MSLQ)*. Ann Arbor: University of Michigan.

Roelandt, Th., Martens, E. P., & Veenman, J. (1991). Ethnic minority children in Dutch education: Ethnic stratification, social class and migration. *Netherlands' Journal of Social Sciences*, *27*(2), 92–107.

Schumacher, R. E., & Lomax, R. G. (1996). *A beginner's guide to structural equation modeling*. Hilsdale, NJ: Erlbaum.

Simons, J., Dewitte, S., & Lens, W. (2000). Wanting to have versus wanting to be: The effect of perceived instrumentality on goal orientation. *British Journal of Psychology*, *91*, 335–351.

Simons, J., Dewitte, S., & Lens, W. (2004). The effect of different types of instrumentality on motivational and cognitive variables. *British Journal of Educational Psychology*, *74*, 343–360.

Simons, J., Vansteenkiste, M., Lens, W., & Lacante, M. (2004). Placing motivation and future time perspective theory in a temporal perspective: Effects of time perspective on student motivation. *Educational Psychology Review*, *16*(2), 121–139.

Sniderman, P., Hagendoorn, L., & Prior, M. (2004). Predispositional factors and situational triggers: Exclusionary reactions to immigrant minorities. *American Political Science Review*, *98*, 35–49.

Social Cultureel Planbureau (SCP). (1999). *Rapportage minderheden 1999: Positie in het onderwijs en op de arbeidsmarkt* [Minority Report 1999: Educational and labour market position]. Den Haag: VUGA, 1997.

Steinberg, L., Dornbusch, S. M., & Brown, B. B. (1992). Ethnic differences in adolescent achievement: An ecological perspective. *American Psychologist*, *56*, 723–729.

Suarez-Orozco, C., & Suarez-Orozco, M. (1995). *Transformation: Migration, family and achievement motivation among Latino adolescents*. Stanford, CA: Stanford University Press.

Tharp, R. G. (1989). Psychocultural variables and constants: Effects on teaching and learning in school. *American Psychologist*, *44*, 349–359.

Vallet, L.-A., & Caille, J. -P. (1996). Les élèves étrangers ou issues de l'immigration dans l'école et le collège francais. I/II/III. Documents de Travail INSEE/CREST, 9616/9614/9615.

Van Calster, K., Lens, W., & Nuttin, J. R. (1991). Affective attitude towards the personal future: Impact on motivation in high school boys. *American Journal of Psychology*, *100*, 1–13.

Van de Vijver, F., & Leung, K. (1997). *Methods and data analysis for cross-cultural research*. Newbury Park, CA: Sage.

Vansteenkiste, J., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the impact of intrinsic versus extrinsic goal framing and internally controlling versus autonomy-supportive communication style upon early adolescents' academic achievement. *Child Development*, *76*, 483–501 .

Vansteenkiste, M., Simons, J., Soenens, B., & Lens, W. (2004). How to become a persevering exerciser? Providing a clear, future intrinsic goal in an autonomy supportive way. *Journal of Sport and Exercise Psychology*, *26*, 232–249.

Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control among Chinese learners. Vitalizing or immobilizing? *Journal of Educational Psychology*, *97*, 468–483.

Veenman, J. (2001). Minorities in Dutch education and the labor market. In K. Phalet & A. Orkeny (Eds.), *Ethnic minorities and interethnic relations in context*. London: Ashgate.

West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modelling. Concepts, issues and applications* (pp. 56–75). Thousand Oaks/London/New Delhi: Sage.

Zéroulou, Z. (1998). La réussite scolaire des enfants d'immigrés: L'apport d'une approache en termes de mobilisation. *Revue Française de Sociologie*, *29*, 447–470.

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Appendix A. Variance–covariance matrix for entire set of variables for each ethnic group separately

Dutch students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
API vs. NPI (1)	.21																			
PPI vs. NPI (2)	−.20	.23																		
ER vs. NR (3)	.01	−.02	.11																	
IR vs. NR (4)	−.00	.01	−.08	.23																
Like (5)	.00	.01	−.02	.05	.46															
Interest (6)	−.04	.04	−.01	.02	.14	.29														
Importance (7)	−.02	.04	−.01	.04	.12	.10	.32													
Task import (8)	.00	.01	−.01	.05	.11	.07	.06	.35												
Understand (9)	−.02	.02	−.01	.03	.04	.07	.08	.03	.30											
Relate (10)	.00	.00	−.03	.06	.12	.05	.10	.08	.06	.34										
Structure (11)	−.01	.02	.00	−.00	.13	.09	.03	.08	.05	.10	.59									
Problem solving (12)	.03	−.03	−.02	.04	.06	.08	.11	.02	.04	.10	.01	.38								
No understand (13)	.04	−.04	.02	−.03	−.00	−.05	−.03	−.05	−.05	.00	−.00	−.04	.40							
Difficulty understand (14)	−.00	−.00	.04	−.05	−.04	−.03	−.03	−.03	−.02	−.02	.01	−.04	.10	.40						
Rote learning (15)	.02	−.02	.01	−.06	−.01	−.01	−.00	−.04	−.04	−.00	.04	−.02	.10	.09	.40					
Easy way (16)	.02	−.02	.03	−.04	−.05	−.08	−.08	−.06	−.07	−.06	−.03	−.08	.10	.10	.10	.43				
Ethnic comp	.01	−.01	.01	−.00	−.01	−.00	−.00	.01	−.00	−.00	−.03	−.02	.01	.00	−.01	.01	.04			
Track	−.07	.14	−.11	.05	−.06	−.05	−.07	−.01	.03	−.11	.18	−.07	−.07	.01	−.07	−.09	−.13	2.04		
Gender	.01	.01	−.01	.04	−.00	−.01	.01	−.03	−.05	−.01	−.11	.06	−.05	−.03	−.04	−.03	−.01	−.05	.25	
Education mother	−.07	.11	−.01	−.02	.02	.00	.02	.00	.04	−.07	.12	−.09	.03	.01	−.06	−.03	−.02	.44	−.06	.99
Moroccan students																				
API vs. NPI (1)	.24																			
PPI vs. NPI (2)	−.21	.25																		
ER vs. NR (3)	−.01	.02	.18																	
IR vs. NR (4)	−.00	−.01	−.16	.21																

Appendix A. (*Continued*)

Dutch students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Like (5)	−.05	.04	.00	.01	.51															
Interest (6)	−.04	.01	.00	.01	.16	.30														
Importance (7)	−.05	.04	−.00	.03	.12	.12	.35													
Task import (8)	−.04	.05	.00	.04	.15	.07	.14	.31												
Understand (9)	−.02	.02	−.05	.05	.03	.08	.07	.06	.28											
Relate (10)	−.02	.01	−.02	.02	.10	.08	.06	.06	.02	.39										
Structure (11)	−.02	.03	.00	.05	.16	.08	.12	.07	.05	.15	.65									
Problem solving (12)	−.05	.04	−.05	.04	.05	.07	.07	.05	.07	.08	.11	.45								
No understand (13)	.03	−.04	.08	−.08	.03	−.04	−.03	−.04	−.06	.03	.07	−.03	.37							
Difficulty understand (14)	−.03	.05	.03	−.01	.07	.00	−.02	.01	−.02	.06	.09	−.01	.11	.42						
Rote learning (15)	−.01	.01	.01	−.02	.09	.05	.01	.05	.03	.06	.02	.04	.11	.16	.38					
Easy way (16)	.01	.00	.04	−.04	−.03	−.06	−.03	.01	−.02	.03	−.06	−.03	.12	.11	.10	.48				
Ethnic comp	−.07	.09	−.00	.00	.00	.00	−.01	.00	−.01	.01	.02	−.01	−.01	−.01	−.02	−.02	.05			
Track	−.02	.02	−.05	.02	−.23	−.22	−.17	−.20	−.06	.06	.04	.07	−.02	−.23	−.13	−.09	−.09	3.09		
Gender	.01	−.06	.02	−.02	−.01	−.01	−.01	−.06	−.05	.05	−.01	−.02	.00	.01	−.01	−.04	.00	−.03	.25	
Education mother	−.07	.11	−.08	.05	−.18	−.07	−.20	−.19	−.05	.05	−.02	−.06	−.11	−.07	−.16	−.12	.08	.20	.06	1.91
Turkish students																				
API vs. NPI (1)	.24																			
PPI vs. NPI (2)	−.20	.25																		
ER vs. NR (3)	−.02	.02	.14																	
IR vs. NR (4)	.01	−.02	−.13	.15																
Like (5)	−.02	.01	−.01	.03	.35															
Interest (6)	−.02	.01	−.02	.03	.13	.28														
Importance (7)	−.01	.04	−.03	.04	.06	.08	.22													
Task import (8)	−.01	.02	−.02	.04	.07	.08	.03	.26												

Appendix A. (*Continued*)

Dutch students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Understand (9)	−.02	.02	.01	−.01	.07	.08	.03	.04	.22											
Relate (10)	−.04	.01	−.05	.04	.04	.09	−.03	.04	.03	.36										
Structure (11)	−.03	.05	−.02	.02	−.05	.02	.00	.05	.03	.02	.53									
Problem solving (12)	.02	−.03	−.02	.03	.07	.04	−.01	.03	.05	.06	.08	.35								
No understand (13)	.01	−.03	.04	−.03	−.01	.00	−.06	.02	−.02	−.02	−.02	−.02	.43							
Difficulty understand (14)	.01	.01	.03	−.02	.01	−.07	−.02	−.03	−.05	−.04	−.11	−.03	.09	.47						
Rote learning (15)	−.05	.06	.04	−.04	−.03	−.02	−.03	.00	.02	−.03	.03	−.03	.14	.09	.41					
Easy way (16)	−.03	.01	.01	−.00	.01	.01	−.01	−.01	−.00	−.01	.01	−.07	.02	.07	.04	.35				
Ethnic comp	.01	−.02	.00	.00	.01	.01	−.00	.00	.00	.01	.01	.02	.00	.01	−.00	−.01	.03			
Track	−.21	.36	−.02	.02	−.22	−.06	.10	−.06	−.02	−.24	.48	−.04	−.18	−.17	.15	−.01	−.08	4.04		
Gender	.00	−.03	.01	−.01	−.01	.00	−.03	.04	.01	.01	.01	.04	.01	.00	.01	−.04	.02	−.21	2.52	
Education mother	−.14	.16	.01	−.04	−.13	−.06	−.04	−.04	.07	.01	.15	−.01	.05	−.07	−.00	.11	.00	.49	−.10	1.48

Appendix B. Means and standard deviations for entire set of variables for each ethnic group separately

	Dutch students		Moroccan students		Turkish students	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*
Ethnic composition	0.28	0.20	0.34	0.23	0.27	0.16
Track	5.61	1.43	4.53	1.76	4.37	2.01
Gender	0.48	0.50	0.50	0.50	1.49	0.50
Education mother	3.58	1.0	1.83	1.38	2.23	1.22
API vs. NPI	0.31	0.46	0.40	0.49	0.41	0.49
PPI vs. NPI	0.65	0.48	0.52	0.50	0.49	0.50
ER vs. NR	0.13	0.33	0.23	0.42	0.16	0.37
IR vs. NR	0.65	0.48	0.72	0.45	0.82	0.39
Understand	2.51	0.54	2.66	0.53	2.69	0.46
Like	1.95	0.68	2.29	0.72	2.43	0.59
Easy way	1.74	0.66	1.75	0.69	1.70	0.59
No understand	1.67	0.63	1.47	0.61	1.64	0.66
Interest	2.06	0.54	2.28	0.55	2.20	0.53
Importance	2.39	0.56	2.47	0.59	2.67	0.47
Relate	1.83	0.58	2.08	0.63	2.11	0.60
Task importance	2.50	0.59	2.62	0.56	2.69	0.51
Difficulty understand	1.58	0.64	1.65	0.65	1.95	0.68
Structure	1.80	0.77	1.92	0.81	2.03	0.73
Rote learning	1.57	0.63	1.44	0.62	1.64	0.64
Problem solving	2.28	0.61	2.21	0.67	2.36	0.59